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10/562,134	03/16/2007	Nigel Tooke	068490-079788	9448

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EXAMINER	
CHUNDURU, SURYAPRABHA	
ART UNIT	PAPER NUMBER
1637	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,134	TOOKE ET AL.	
	Examiner	Art Unit	
	Suryaprabha Chunduru	1637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 October 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-12 and 14-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,8-12 and 14-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 January 2008* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The Applicants' response to the office action field on October 12, 2009 has been considered and acknowledged.

Status of the application

2. Currently claims 1-6, 8-12, 14-25 are pending under examination. Claims 7, 13, 26-34 are cancelled. Applicants' arguments and the amendment have been fully considered and deemed persuasive in-part for the reasons that follow.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

A. Claim 1-6, 8-12, 16, 19, 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Jansson et al. (US 2008/0044813A1).

Jansson et al. teach a method of claims 1-5, for determining the presence of a genetic element (mutation or single nucleotide polymorphism) in a nucleic acid sample (bacteria or virus sample) comprising

(a) providing a nucleic acid sample comprising a genetic material a genetic element (see page 1, paragraph 0004);

(b) providing oligonucleotides that are complementary to said nucleic acid (see page 1, paragraph 0007);

(c & d) annealing at least two oligonucleotides to said nucleic acid and ligating said oligonucleotides to each other using a ligase enzyme (see page 1, paragraph 0007);

e (i) converting ligation-by-product to ATP (see page 2, paragraph 0019);

(e) detecting pyrophosphate as a ligation-by-product to determine whether a ligation reaction has occurred, as a measure of the presence of the genetic element wherein said method steps are performed simultaneously or subsequently (see page 1, paragraph 0007, page 2, paragraph 0019, page 2, paragraph 0019).

With regard to claims 6, 16, Jansson et al. teach that an oligonucleotide is adapted to anneal immediately outside a repeated sequence (target sequence) (see page 1, paragraph 0007).

With regard to claim 8, 10-12, Jansson et al. teach that said step d) is performed employing a NAD+dependent DNA-ligase or ATP dependent ligase using dATP as a substrate (New England bio labs and Amersham Biosciences) (see page 1, paragraphs 0001-0003, paragraph 0014).

With regard to claim 9, Jansson et al. teach that step e) is performed employing a pyruvate phosphate dikinase (see page 2, paragraph 0020, 0029).

With regard to claim 19, Jansson et al. teach that the nucleic acid sample is immobilized to a support (see page 2, paragraph 0016-0018).

With regard to claim 22, Jansson et al. teach that the luciferase-based assay is a luminometric assay (page 2, paragraph 0019). Accordingly the claims are anticipated.

B. Claim 1-6, 9, 14, 16-18, 20-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Shultz et al. (US 6,235,480).

Shultz et al. teach a method of claims 1-5, for determining the presence of a genetic element (repeat sequences or single nucleotide polymorphism) (see col. 56, line 9-22) in a nucleic acid sample (bacteria or virus sample) comprising

(a) providing a nucleic acid sample comprising a genetic material a genetic element (see col. 22, line 3-7);

(b) providing a pair of oligonucleotides that are complementary to said nucleic acid (see col. 22, line 7-22);

(c & d) annealing at least two oligonucleotides to said nucleic acid and ligating said oligonucleotides to each other using a ligase enzyme (see col. 22, line 3-59);

e (i) converting ligation-by-product to ATP (see col. 37, line 22-37);

(e) detecting pyrophosphate as a ligation-by-product to determine whether a ligation reaction has occurred, as a measure of the presence of the genetic element wherein said method steps are performed simultaneously or subsequently (see col. 22, line 3-59, col. 41, line 42-56).

With regard to claims 6, 16, Shultz et al. teach that an oligonucleotide is adapted to anneal immediately outside a repeated sequence (target sequence) (see col. 22, line 3-22).

With regard to claim 9, Shultz et al. teach that step e) is performed employing a pyruvate phosphate dikinase (see col. 50, line 7-10).

With regard to claim 21, Shultz et al. teach use of amplified target nucleic acid (see col. 16, line 60-67, col. 17, line 1-15).

With regard to claim 22, Shultz et al. teach that the luciferase-based assay is a luminometric assay (see col. 41, line 42-47).

With regard to claims 14, 23-24, Shultz et al. teach that the light produced by a luciferase reaction is enzymatically turned off by the addition of apyrase (ATP-sulfurylase) (see col. 50, line 7-17).

With regard to claims 17-18, 20, Shultz et al. teach that the unannealed oligonucleotides are removed by using exonuclease, phosphatase or by washing (see col. 30, line 64-67, col. 31, line 1-2, col. 38, line 15-35, col. 108, line 55-67, col. 109, line 1-21). Accordingly the claims are anticipated.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 15, 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jansson et al. (US 2008/0044813A1) in view of Schalling et al. (US 5,695,933).

Jansson et al. teach a method for determining the presence of a genetic element in a sample as discussed above in section 3A. However, Jansson et al. specifically teach repeat sequence in the oligonucleotide and normalization of the signal.

Schalling et al. teach a method determining the presence of a genetic element (nucleotide repeat) in a nucleic acid sample comprising

(a) providing a nucleic acid sample comprising a genetic material a genetic element (see col. 1, line 66-67, col. 2, line 1-19);(b) providing oligonucleotides that are complementary to said nucleic acid (see col. 2, line 1-19);(c & d) annealing at least two oligonucleotides to said nucleic acid and ligating said oligonucleotides to each other using a ligase enzyme (see col. 2, line 2-34); (e) detecting ligation-by-product to determine whether a ligation reaction has occurred, as a measure of the presence of the genetic element wherein said method steps are performed simultaneously or subsequently (see col. 2, line 35-46). Schalling et al. also teach (i) said oligonucleoitde comprises repeat sequences (see col. 1, line 66-67, col. 2, line 1-19) ; and an oligonucleotide in step b) is adapted to anneal immediately outside a repeated sequence and the signal generated from said oligonucleotide is used to normalize the signal generated form a region to be analyzed (see col. 2, line 20-34, col. 6, line 1-10).

Therefore, it would have been prima facie obvious to a person of ordinary skill in the art at the time the invention was made, to combine the method as taught by Jansson et al. with repeat sequences and normalization of the signal as taught by Schalling et al. to achieve expected advantage of developing an improved sensitive method for detecting the genetic elements in a target nucleic acid. An ordinary person skilled in the art would have motivated to combine the references because the ordinary practitioner would have a reasonable expectation of success that the combination would result in improving the specificity by reducing the non-specific and unintended products because Schalling et al. explicitly taught that the use of repeat sequences and normalization of signal to achieve specific target detection (see col. 2, line 20-34, col. 6, line 1-10) and such a modification of the method is considered obvious over the cited prior art.

Response to arguments:

5. With regard to the informalities to the claims 1-25, Applicants' arguments and the amendment were fully considered and found persuasive. The objection is withdrawn herein in view of the amendment.

6. With regard to the rejection of claims 1-25 under 35 USC 112, second paragraph, Applicants' arguments and the amendment were fully considered and the rejection is withdrawn herein in view of the amendment.

7. With regard to the rejection of claims 1, 21, 25 under 35 USC 102(b) as being anticipated by Grossman et al., Applicants' arguments and the amendment were fully considered and the rejection is withdrawn herein in view of the amendment.

8. With regard to the rejection of claims 1-2, 6, 15, 16, 25 under 35 USC 102(b) as being anticipated by Schalling et al., Applicants' arguments and the amendment were fully considered and the rejection is withdrawn herein in view of the amendment.

9. With regard to the rejection of claims 1-13, 19, 22 under 35 USC 102(e) as being anticipated by Jansson et al., Applicants' arguments and the amendment were fully considered and found unpersuasive. Applicants argue that the Jansson et al. teach pyrophosphate as one of the products of various enzymatically catalyzed reactions and does not teach said pyrophosphate as a ligation-by-product. The arguments were found unpersuasive because Jansson clearly teach said pyrophosphate as one of the products of enzymatic reactions after ligation of the oligonucleoitdes. Thus it is anticipatory that the release of said pyrophosphate after ligation is indicative of ligation-by-product. Accordingly the rejection is maintained and re-written as above.

10. With regard to the rejection of claims 1-7, 9, 13-14, 16-18, 20, 22-24 under 35 USC 102(b) as being anticipated by Shultz et al., Applicants' arguments and the amendment were fully considered and found unpersuasive. Applicants argue that the Shultz et al. teach pyrophosphate as a product of luciferase mediated catalysis of luciferin and does not teach said pyrophosphate as a ligation-by-product. The arguments were found unpersuasive because Shultz et al. clearly teach said pyrophosphate as the product of luceferase-mediated catalysis after ligation of the oligonucleoitdes. Thus it is anticipatory that the release of said pyrophosphate after ligation is indicative of ligation-by-product. Accordingly the rejection is maintained and re-written as above.

11. With regard to the possible obviousness of Jansson et al. and Shultz et al. teachings, Applicants' arguments were found unpersuasive because as discussed above Jansson et al. and Shultz et al. does anticipate the claims and it is obvious to modify the method as discussed above.

Conclusion

No claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Suryaprabha Chunduru whose telephone number is 571-272-0783. The examiner can normally be reached on 8.30A.M. - 4.30P.M, Mon - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on 571-272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Suryaprabha Chunduru/
Primary Examiner, Art Unit 1637